

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

To:

see form PCT/ISA/220

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/JP2006/306992

International filing date (day/month/year)
27.03.2006

Priority date (day/month/year)
28.03.2005

International Patent Classification (IPC) or both national classification and IPC
INV. H03B7/14

Applicant
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1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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PCT/ISA/210

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2006/306992

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in electronic form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. II Priority

1. ☒ The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date (Rules 43*bis*.1 and 64.1) is the claimed priority date.
2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2006/306992

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	3,4,7,8
	No: Claims	1,2,5,6
Inventive step (IS)	Yes: Claims	3,4
	No: Claims	1,2,5-8
Industrial applicability (IA)	Yes: Claims	1-8
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V.

1 Reference is made to the following documents:

D1: US 5 617 104 A (DAS ET AL)

D2: UTSUMI Y ET AL: "Dielectric properties of microstrip-line adaptive liquid crystal devices", XP002385402

D3: US 2003/122628 A1 (AIKAWA MASAYOSHI ET AL)

D4: EP-A-0 288 135 (UNITED KINGDOM ATOMIC ENERGY AUTHORITY)

2 INDEPENDENT CLAIM 1

2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT.

Document D1 discloses a frequency tunable oscillator (see figure 14) comprising: a negative resistance element (411) and a resonator (microstrip 406) together forming a feedback circuit (see the figure), and further comprising, in at least a part of the feedback circuit, a distributed constant material (413) so configured as to have a distributed constant (permittivity, see column 9, lines 57-63) such that an electrical length in the resonator is modulated (this is assumed to mean that the electrical length of the resonator is dependent on the distributed constant of the distributed constant material, which is implicitly disclosed in D1 since the resonator is coupled to the microstrip).

D1 further discloses a modification means (voltage source V2) for externally modifying the distributed constant material (column 9, lines 57-63), wherein the oscillation frequency is allowed to vary through (*made to vary by?*) the external modification by the modification means (column 9, lines 57-63).

Claim 1 is therefore not new.

3 DEPENDENT CLAIMS 2, 5-8

Dependent claims 2 and 5 to 8 do not contain any features which, in combination with the features of the independent claim, meet the requirements of the PCT in respect of novelty and inventive step (Article 33(2) PCT).

3.1 The additional features of claims 2, 5 and 6 are known already from D1. These claims are therefore not new. See in particular:

- column 9, lines 21-25: the ferroelectric material can be ferroelectric liquid crystal;
- column 9, lines 29-30: microstrip line 406;
- column 9, lines 47-51: output coupling transmission line 409;

3.2 In view of the fact that D1 discloses "a negative resistance diode such as GUNN

(GaAs, InP), IMPATT, TRAPATT", it is trivial to use other types of negative resistance diodes than those explicitly mentioned. The additional features of claim 7 are therefore trivial.

3.3 The additional features of claim 8 relate to an application of the frequency tunable oscillator which is known from i.a. document D4 (see figure 2). Since the oscillator of D1 is clearly appropriate for use in the application of D4, claim 8 is lacking an inventive step over the combination of documents D1 and D4.

4 DOCUMENT D2

It is furthermore noted that D2 discloses a tunable microstrip resonator which appears to be closer to the disclosure of the application than the subject-matter of D1. The inclusion of the resonator of D2 in an oscillator is a trivial matter and consequently the examiner considers that claims 1, 2 and 5 are lacking an inventive step also over document D2. Concerning details of a suitable oscillator in which the tunable resonator may be used and application to a sensing apparatus, D2 can be combined with the documents D3 and/or D4 such that also claims 6-8 do not involve an inventive step.

5 CLAIM 3

The subject-matter of claim 3 concerns the embodiment of the invention using "electrophoretic particles". The search did not reveal any document disclosing an oscillator tunable by such means. However, the disclosure of this embodiment is so vague that the examiner considers there to be insufficient disclosure of how this embodiment may be carried out. Even limiting the interpretation of the claim to the described embodiment where the electrophoretic particles are contained in a solution in the substrate of a microstrip resonator, the description provides no example of any material suitable for use as the electrophoretic particles/solvent or the necessary holding material. Given that the suitability of the material cannot depend solely on the electrophoretic nature of the particles, i.e. also conductivity/permittivity factors must be considered, the burden placed upon the skilled person in implementing this embodiment is so high that the description does not allow a reliably functioning oscillator to be implemented. The skilled person can only construct a functioning oscillator should he, by chance, select appropriate materials. Consequently, this embodiment, and claim 3, do not meet the requirements of Article 5 PCT or Rule 5.1(a)(v) PCT.

6 CLAIM 4

The subject-matter of claim 4 lacks clarity (Article 6 PCT) since the disclosed

embodiment employing a "bimetal alloy" does not fall within the scope of the independent claim. Claim 1 claims a resonator and a separate distributed constant material, whereby a distributed constant of the distributed constant material is externally modified and the electrical length of the resonator is thereby modulated. In the embodiment of claim 4 however, the resonator and the "distributed constant material" appear to be one and the same thing. Additionally, an alloy is a compound of at least two metals, whereas the current embodiment does not seem to employ an alloy at all, merely a strip comprising separate layers of two metals. Hence the use of the term "alloy" is incorrect and unclear. Furthermore, the use of the term "distributed constant material" in respect of a metal strip, the distributed constant apparently being its shape, is misleading. Nonetheless, the search could be carried out based on the description and did not reveal any oscillators comprising a microstrip resonator comprised of two layers of different metals tuned in the manner described on page 12, lines 1-11. Hence claim 4, when interpreted, and suitably limited, in view of the description can be considered inventive.

7 The examiner however notes that should the opinions regarding disclosure of claim 3 and clarity of claim 4 be overcome, this would likely lead to non-unitary claims.